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SWEDISH GYMNASTICS

—BY—

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Simon Davis.

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Introduction.

The enclosed articles, originally issued in separate pamphlets were distributed from the Swedish Gymnastic exhibit (Stockholm Gymnastic Association and Posse Gymnasium) in the World's Columbian Exposition, Chicago, 1893. As they have since gone out of print and the demand seems to warrant it, they are now re-published and have, for more convenience, been brought together in one volume.

THE AUTHOR.

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I.—THE NECESSITY OF PHYSICAL EDUCATION
AND
THE MEANS OF INTRODUCING IT INTO AMERICAN SCHOOLS.

READ BEFORE THE RHODE ISLAND INSTITUTE
OF INSTRUCTION, PROVIDENCE, R. I.,
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Proportionately as the world grows democratic, so mankind wakens to the fact that the standard by which men should be compared cannot be one of wealth, nor of knowledge, nor of birth, nor of any artificial make, but that it must be one of culture; as democracy has grown out of popular education, so the propagation of culture has become the vital consideration of all true men.

But while the promoters of civilization in this grand amalgamation of countries and of races—the United States—have clearly been infused with the importance, the necessity, of education, yet, until recently, it appears as if they had overlooked or underestimated the fact that man, after all, is an animal, and that to be perfect, first of all "man must be a perfect animal," to quote from an eminent American writer. It is thus that education has largely become a cultivation of knowledge, instead of a cultivation of man as an individual forming an integral part of the chain which joins *That which always was* to *That which always will be*—a cultivation of the race with a progression towards perfection. The highest aim of education must of necessity be to so improve each generation, that the good acquired or produced by art in that generation may finally become inherited, produced by nature; to make each man, each woman, contribute to the advancement of humanity by making them *fill* the place assigned to them.

Obviously, then, education is a training of the individual in order to develop to the highest degree his possibilities for good. Hence each individual must be considered by himself, a unit, a thing complete or incomplete as related to himself. Since Man possesses body, mind and soul, he becomes complete only when the physical, mental and moral forces within him exist in equilibrium and combine towards harmonious action,—when body and mind together form the expression of the soul. When this expression is good, then man possesses culture. Culture of the whole, however, presupposes culture of the parts, and thus man cannot become perfect until each phase of his nature has reached its acme of power. The popular education of to-day provides amply for intellectual and moral improvement, but does it do as well for the physical? If not then popular education in this country is as yet incomplete, and must so remain, until physical training forms a part proportionate in quality and quantity to the other two.

Moreover, is it possible to acquire the highest degree of intellectual and moral culture without proper attention to the physical, if we accept that intellectual education includes the elements of knowledge and of discipline, that moral education is designed to cultivate adherence to duty; and that discipline and duty are both founded upon self-control? We must answer in the negative; for self-control, in the broad meaning which we must give to that word, implies control of the mind over the body as well as over itself, so that the good impulses of the one will enhance those of the other, and the evil impulses will be restrained. Granted also that the brain is the seat of the mind and that "morals" depend upon the activity of the brain and of the sympathetic nervous system, it follows, first, that healthy activity of the brain and of the sympathetic nerve is a matter of necessity; second, that since healthy impulses from the sympathetic nerve depend upon a normal activity of the functions in general, it becomes evident that the purely physical condition will largely control the intellectual and the moral forces. Physical education, or the systematic training of the physical powers to produce and to preserve health, then, must be regarded as an urgent necessity, and as the basis of all other education.

Since the belief has obtained that knowledge is power, that mind is all important, matter of but little consequence, the mind has been nursed with hot-house care, the body abused in proportion; meanwhile civilization has gradually taken a form where the physical surroundings tax the bodily tenacity to the utmost, so that physical strength becomes more than ever the condition for the survival of the race. Is it not then, of the greatest importance that the growing be provided with some means to withstand this pressure of civilization? Or, is it better to rely on the physician and the druggist to counteract these constant efforts to separate the mind from its abode? It is probable that man was given a body for some purpose other than abuse; that it was intended to form an aid in the evolution of the soul; and that, as such, it will be of the greatest value only when it possesses the utmost power. Hence, let us endeavor to train the physical forces, so that they may become proportioned to the demands made upon them by intellectual, moral and civilized life; in other words, let us make physical training a compulsory part of popular education.

Then, if physical training is to be introduced, how is it to be taught, where and by whom?

The first of these questions may be interpreted thus: What system of gymnastics should be used, and what can reasonably be demanded from the one chosen? If I suggest to you that the so-called Swedish system be used, I will not only give good reasons for so doing, but I will also make an additional suggestion--one which will perhaps surprise those who do not realize that a true teacher of gymnastics recognizes no one-ideaism—I shall suggest that the Delsarte system of expression be made to suppliment the Swedish exercises.

Let us inquire into what a system of educational gymnastics should contain. For school purposes it should be a general, physical education, without regard to special training. It should aim at the development of health rather than that of physical dexterities. For he possesses physical culture whose body is in a state of fairly normal functional activity, and who has his conscious forces well controlled. Special skill, such as is found in the professional athlete, may be necessary for freaks and clowns, who live and die to amuse the crowd, but for an average individual it is undesirable, since it will be found that no part of the body can be trained to possess exceptional power unless other parts are correspondingly neglected, the usual outcome of such training being ill-health or lack of physical equilibrium. The body is to be exercised for its own sake, so that its parts may become properly balanced to form one smooth, complete whole. where the force inherent in the germ has reached its acme of power; it matters little whether this power is greater or less than that of others. All cannot reach the same intensity of either intellectual or physical force, and yet he who attains the utmost of his abilities has succeeded in filling his place as perfectly as those who may have outwardly surpassed him.

The exercises to be used should aim to perfect the functional rather than the mechanical activity of the body; they should be so constructed that they heighten respiration, circulation, metabolism, etc., and hence they must be based upon the laws of physiology. They must also conform to the laws of anatomy and animal mechanics, for reasons so often demonstrated that they hardly need a review.

To develop the body as a whole, the exercises must cultivate forms of movement common in everyday life; for such a purpose comparatively few forms are necessary, and many must be eliminated even though they may be anatomically and gymnastically possible of execution. For, first of all, we consider the physical and physiological effects of the exercise, and not until we are satisfied that those effects are needed do we apply the movement; no time should be wasted on practically useless movements; and it follows without saying that no exercises are to be applied whose effects are injurious or in the least doubtful. In physical education it is necessary to be quite as exact as in intellectual education. In the Swedish system the exercises have been carefully thought out and investigated as to effects; and in its present shape the system offers the most complete general body education of any as yet produced. But it does still more: whole classes of exercises have been introduced especially to counteract the tendencies to abnormal development produced by perverted civilization, so that special attention is given to the correction of posture and general outline, the system thus embracing both sides of education; it teaches and it corrects.

The exercises should be so arranged that they make the mind conscious of the body; for as all movement originates in the will, it is necessary for this will to be so intimately connected with motor forces that they yield to even its slightest impressions. In other words there should be the utmost concentration of the mind into the body during the exercises. This is true, according to our definition of culture, given above. The body is to be the servant of the mind, hence it should be subordinated to the will and always ready to respond to it. Intellectual education tending to disconnect mind and body by concentrating the intellect upon abstract subtleties external to the body, distracting thought—the ever living—from body—the ever dying—it should be the aim of physical education to restore that psycho-physiological equilibrium, whose complete disorganization is identical with temporal death. The object of man being first of all to live in the flesh, education, therefore, should bring forth the best conditions for such life, or prove a failure.

It is to be understood, however, that any and all exercise does not necessarily produce this conscious harmony between mind and body, but that this effect is accomplished only by exercises requiring the utmost volition. An easy way to call forth this consciousness is the use of commands in applying the exercises; for by these the pupil is forced to concentrate his mind upon his movement, to the exclusion of all other considerations; his mind returns into his body, his soul into its abode. This makes the pupil conscious of himself—conscious of his power; not self-conscious or conscious of his lack of power, whether this (or the lack of it) be physical, mental or moral.

The use of commands also aids in cultivating discipline, another necessity of education. The subordination of the body to the mind producing self-control, the foundation of discipline is laid by the exercises cultivating the response to volition; and now we arrive at the next stage of its evolution, the will subordinating itself to that of another. The teacher determines the movement and communicates his will by the spoken order, the pupil's will obeys and the movement then occurs through his mediation. Obedience finally becomes acquired and blended into the character of the pupil; and the embryo will grow into the law-abiding mind of a citizen, a man of power and self-control.

The exercises should develop the body in a two-fold direction, that of force and that of motor coördination. All organs and tissues grow when properly exercised, *i. e.*, when there is a gradual increase in the demand made upon their action. Thus the power of the lungs, with certain limits, grows with the increased absorption of oxygen in the body; that of the heart or other muscles, with the resistance offered to their contractions provided the resistance is kept within the easy limits of normal contraction, etc.; and hence the exercises should have a progression from the easy to the strong in even pace with the development of physical force, bearing in mind that although the growth of muscular fibre decides this progression, the muscles are merely tools by which we exercise and affect internal organs, and that it is the relative activity of the latter and not the size of the muscles on which we should base our conception of physical power. It can be stated, generally, that the power of the body depends on the equilibrium between its three leading properties, extensibility, contractility and elasticity, and that, to be complete, a system of gymnastics should contain movements to develop this trinity; yet so, that when applied as a means of education movements of contraction are not practiced where contractility already predominates, nor movements of relaxation where extensibility prevails, etc ; for general education, whether physical or mental, is intended to bring forth that which is undeveloped, and not to cultivate special proclivities.

But of even more importance than the cultivation of force is that of motor coördination, for this is a training of the will and of the response to it in nerves and muscles. It may be well to have a muscularly strong arm and leg, but unless they readily respond to all the shades of volition to produce quick or slow, gentle or powerful motions, those limbs are of but little use, their movements become unwieldy and energy is wasted. Training of coördination is a training of the speed as well as of the intensity of motor impulses, intended to produce exactness of effect, so that only the energy necessary is expended for the movement. The cultivation of speed of motion is of no little consequence, since speed may often substitute the lack of actual force in overcoming resistance. A system of gymnastics must contain both rapid and slow movements in order that a graded receptiveness to motor impulses may become developed, and usually so that the quick movement preceeds the slow one, the former producing the rapid succession of thought and action, the latter cultivating the control of concentrated energy.

Movements should be practised until their coördination becomes registered in the centres of automatic action, so that their correct execution may grow to be inherent and comparatively independent of volition. At this point a still more difficult combination should take its place for practice, for the automatic movement is not developing and hence should be relegated to places of review. In this manner the exercises should follow each other to form an ever-increasing stimulus to the evolution of volition and of coördination, the pupil gradually acquiring that control of mind over body which constitutes the dexterity of physical, every-day life; his movements become well-regulated as to space, time and purpose, and grace of movement results, for grace is synonymous with perfect voluntary and automatic coördination.

But while this is going on, motor centres in the brain are being exercised, and that which always follows systematic exercise of any organ—development—results. The nutrition of brain tissue increases, cell is added to cell, and the power, the functional activity, of all the motive portion of the brain is heightened; and like phenomena occur throughout the peripheral neuromotor apparatus. Meanwhile that portion of the nervous mechanism which is intended to carry impulses to our perceptions is kept comparatively at rest. Under ordinary circumstances, the emotive neuro-apparatus is constantly being kept in activity, a condition tending to disturb the equilibrium of the different nervous systems. The practising of muscular movements necessitating full volition will restore and retain this equilibrium. It is just on account of the effect upon the nervous system that gymnastics may become truly educational; for the coördination of movement produced is really a coördination of thinking, and the exercises will thus have a direct influence upon the activity of the mind. The investigations of Pres. White, Dr. Wey of Elmira, and others, amply verify this statement.

An account of the results in brain development from the proper alternation of symmetrical and unilateral movements would be interesting as an illustration of this point, but must be deferred.

Exercises done with the utmost volition to produce an exact coördination develop in the pupils that great power which we call *repose*, or the control of force to hold immovable that which is not absolutely needed for perfect action. Muscular isolation and coordination are mere expressions of the power to localize effort; if it exists in the concrete it will also in the abstract. Once developed, this repose will manifest itself in the thinking that is directed from the body as well as that which is directed into it Since this effect upon the mind through the body can be achieved by exercise, that system which accomplishes the most in this direction should be introduced into the schools. The Swedish system fills this requisite better than any other, and hence is the one best suited for educational purposes.

Before concluding, allow me to make a few suggestions as to the manner of introducing physical training into the schools. The problem is not as easy of solution as some have supposed; for not only are the schools of this country numerous, but the classes are large and numerous as well, and if special instruction must be engaged the expense of gymnastics will be very great. If any one should labor under the erroneous impression that special instructors are not necessary, let me state most emphatically that to teach gymnastics a special education and a natural aptitude are indispensable, for in order to accomplish the best results, the one who applies gymnastics must be thoroughly familiar with all those sciences which are fundamental to gymnastics—and, believe me, it takes more time and study to acquire this knowledge than the average school teacher is willing or able to give; and even then a majority of teachers will find that teaching gymnastics is quite a different thing from giving object lessons or hearing recitations;—many an otherwise good teacher would prove a failure as far as physical training is concerned. At least practical tests have proved this in several instances.

But since the expense makes it inexpedient to engage many special instructors, what would be the next best solution of the problem? To let each teacher in the kindergarten, primary and lower grammar grades teach her own class, or let one of the teachers in each building apply the exercises throughout all the classes, and to have special instructors in the upper grammar and high schools who can easily visit several schools in a day. At the head of it all should be a supervisor or director of gymnastics, who should give weekly instructions to the teachers, thoroughly drilling them on what to do and how to do it. The director could be conveniently assisted in this work by the special instructors; but all supervision should be left to him. The director must necessarily be an expert and an experienced teacher of gymnastics, not merely a figure-head, drawing his salary, and relying on others to do his work. He should possess that broad knowledge of gymnastics which enables the teacher to carry out the kinesiological progression under the peculiar circumstances by which he will be surrounded in this country. For it is to be remembered that while the Americans form one nation, yet that nation is made up of the most different nationalities and races, each with its peculiar characteristics; and even though "anatomy and physiology are the same the world over", there is no eluding the fact that mental power is not the same, and that hence nationality and race must influence the choice of exercise as well as the progression. My advocating the introduction of the Swedish system may appear like a contradiction, and, you may think, that an "eclectic system, embracing the best of all" would be more suitable. But the Swedish system *is* eclectic, it embraces the best of all, and ample provision is made in it for modifications necessitated by the surroundings. Swedish gymnastics are educational according to the principles of general kinesiology, and have been called Swedish because they were scientifically arranged by a Swede, not because they were intended for the Swedes alone: like all other sciences they are cosmopolitan, and belong to the world at large. The school-board should decide the *esse* or *non-esse* of gymnastics, but should wisely leave it to the director to decide the form The prefix *Swedish* today in this country, merely stands for *rational*, even though much is passed off as Swedish which has but little in common with it but the name.

Whosoever teaches gymnastics must remember that he has to develop individuals, and that he should use the best means, so that if one way does not succeed he is ready to try another. There are no set forms of drill to fit all classes or teachers, any more than there is one size and shape of clothing that will fit all men.

In order that the best results should be obtained, gymnastic apparatus is a desideratum, and it is only a question of time when every grammar and high school will have its own gymnasium. For the lower grades, however, free-standing exercises in the school-room will always prove sufficient, and will, moreover, lay a good foundation for the more advanced work in the gymnasium. To sum up: physical education is a necessity: it is best taught by special instructors, and the Swedish system is recommended as the best.

Although the Swedish system is complete in itself as a system of physical training, æsthetical gymnastics might be added for very advanced classes. For while educational gymnastics develops the body and cultivates the mind, the æsthetical goes a step farther; it brings out the relation between the body and the soul. Conceded that all thinking is done with motor centres, mind and body in their action are really one, the physical, temporal or motive side of man; his soul is the part, spiritual, eternal, emotive. To make man complete, these two sides must be so united as to work in harmony and mutual dependence—one to form an expression of the other.

Then after Swedish gymnastics has developed a strong body, the ready tool of the mind, let the Delsarte system of expression round off the man, and make him more perfectly a unit, the oneness growing out of the harmony of body, mind and soul—a perfect trinity.

II.—HOW GYMNASTICS ARE TAUGHT IN SWEDEN.

READ AT THE THIRTY-EIGHTH ANNUAL MEETING
OF THE MIDDLESEX TEACHERS' ASSOCIATION, TREMONT TEMPLE, BOSTON,
MASS., OCTOBER 31, 1890.

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Within the last year or two, Swedish gymnastics have taken long strides toward being introduced as part of the American system of education. During this time much has been written on the subject and a great deal more has been exhibited practically, not only in Boston but in other cities as well. The system, introduced in Waltham, Northampton, Brockton, Somerville, Salem, Lynn, Worcester, and emanating from Boston, has found its way to Brooklyn, N. Y., Hartford, Conn., Indianapolis, Ind., and to many other cities in the east and in the far west.

It has been said that Swedish gymnastics constitute a "fad" of today, but it is fair to presume that they have "come to stay," for truths like those on which this science is based are not evanescent, they grow more and more admirable with each closer inspection. Swedish gymnastics have stood the test of generations of learned investigators, and yet they remain almost unaltered in the foreground, and are still acknowledged to be superior to all gymnastics up to the present day.

In order not to weary the many who have already had explained to them the theory of this system, I shall discuss a subject which may be of more practical interest, that is, how to introduce gymnastics into the schools with the best results; for all the theory in the world would help but little if there were no practical application to go with it.

In teaching, the object is not to teach a great deal, but to teach well. The desirability of a teacher's knowing most thoroughly the theory of his subject is indisputable, and there can be no doubt that a wide and diversified knowledge broadens a man's character and benefits him in many other ways; yet we often find that the teacher who has confined himself to the mastery of one subject and has accomplished it, is the most successful. The teacher who has a smattering or a "picked-up" knowledge of all kinds of gymnastics is the one to be the most dreaded; he is the one who will go the fartherest and accomplish the least. He knows so much that he has no way of putting his knowledge into practice. The experience of every teacher of gymnastics may be summed up in a few words: (1) beware of the self-taught instructor; (2) of the one who has had only an elementary training; (3) of the one whose training includes everything under the sun. More respect is due to the teacher who conscienciously applies one system of gymnastics, though it be inferior, than to him who uses "the best of the American, the German, the Delsarte and the Swedish systems," and better results may be expected in the first case than from the "eclectic" teacher.

Perhaps the best preparation for introducing a new thing is to find out what others have done, so it may be helpful to speak of the manner in which gymnastics are taught in Sweden, especially since Swedish gymnastics are coming to be so extensively adopted.

The schools of Sweden may be divided into two classes, the free schools, and the schools where tuition is paid; both of these being under the supervision of the government. The former give instruction only in those branches, a knowledge of which is necessary to enable men and women to take an intelligent interest in the affairs of the nation. The latter are divided into two grades, the grammar schools and the high schools, or *gymnasia*. We also have three universities, one in Upsala, one in Lund and one in Stockholm, and one more is being established in Gothenburg. These grades differ essentially from those of the American schools. Our free schools correspond to grammar schools, our grammar schools to high schools, and our gymnasia to colleges in America. A high school or gymnasium diploma from Sweden (no matter from what part of the country) may be accepted here as the equivalent of A. B. or B. Sc. (Harvard).* The average age of our high-school graduates is 21.

We have no kindergartens, the Swedish mothers preferring to take sole charge of their childrens' early training, and though the grammar schools have so-called "preparatory classes," the majority of our children are educated at home and taught morals and manners before they are put into the public schools.

Sweden is a country of specialists. In all the schools of high grade, each teacher gives instruction in a certain branch for which he has fitted himself with the utmost care; he is a master of that particular subject and teaches nothing else. The free schools are conducted very much like the public schools of America, having for each room a teacher who teaches all the branches. These teachers, however, do not attempt to give instruction in gymnastics, unless they have had a normal course in this branch; for we do not believe that "any exercise is better than no exercise at all." To apply gymnastics without knowing how, would be just as dangerous as to practice medicine without previous special study. In the larger cities, like Stockholm, a special teacher goes through the school once a day and gives the exercises in each room, since the free schools are not supplied with gymnasia, chairs and desks are used as apparatus, and it is surprising to see how the trained teacher makes these simple paraphernalia answer all gymnastic purposes.

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*The "certificate of maturity" from the classical course equals Bachelor of Arts, that from the scientific course, Bachelor of Sciences.

When the exercises are given in the school-room they seldom occupy more than fifteen minutes a day, a small dose, which when oft repeated, produces more effect than if the lesson lasted thirty or forty-five minutes, and were repeated only twice or three times a week. Every school has a spacious gravelled yard, and here, in some of the free schools, apparatus is put up. When the weather permits, the teacher gives the lesson out-of-doors and uses these appliances. In the smaller country towns, gymnastics have not been put into the schools as thoroughly as might be desired; but money in those places is scarce and a special teacher demands a good salary for his services. As a rule, however, there is at least one teacher in the school who has had an elementary course of gymnastics in the "seminaria" or normal schools, and who takes charge of the physical exercise. It is to be especially noticed that these instructors do not attempt movements in which they have had no instruction, and of which as a consequence. they know very little.

8T If we now turn to the grammar schools and gymnasia or high schools, we find that every one has its own gymnasium in the same building, or else is located near some gymnasium, to which the children are sent once a day for exercise It is needless to say that each school has its own special teacher of gymnastics, always a graduate of the Royal Gymnastic Central Institute. The whole school is divided into two parts, children from eight to fourteen and those from fourteen to twenty (or over). Each section, containing sometimes as many as two hundred children, has at least thirty minutes a day for gymnastic work, usually so that the little ones have their exercise immediately before noon-recess, and the others theirs just after the afternoon session. It requires a great deal of skill to handle such large classes in so short a time and yet supply the physical needs of each individual, without overtaxing his ability. But the teachers are able to do it. and that with the very best results.

It should be remembered that Sweden has schools for boys and schools for girls, and that the two sexes do not have instruction in common, except in the free schools and in the universities. This makes it easier for the teacher of gymnastics, as boys and girls must, of necessity, have different exercises, especially after the age of twelve to sixteen, sex having a strong influence upon the progression of the exercises. The teacher of gymnastics in the boys' school is always a man, in the girls', usually, but not always, a woman. All the children are obliged to take the exercises, unless they suffer from deformity or organic disease. where gymnastics are contra-indicated. To decide who should and who should not exercise, a physician examines all the children at the beginning of the school-year, and gives a certificate of ill-health to those who are to be excused. He does not, however, measure every child and prescribe the exercises for the individual; for in the first place, measure-ments taken on growing children are no test of physical development, since a child changes shape and size almost from day to day; and in the second place, a physician is not competent to prescribe exercises, unless he is a teacher of gymnastics as well, which in Sweden means a graduate of the Royal Gymnastic Central Institute. All the children as far as possible, are sent into the gymnasium and the teacher of gymnastics is responsible for results, without being interfered with by anyone. He is not restricted as to the system of gymnastics he is to apply; he has entirely free hands as to means and methods, for he is supposed to be a master of his profession; he may use any form of exercise that he sees fit, and if the weather is pleasant, he may take the children out of doors for gymnastic games, instead of keeping them in the gymnasium. He groups his pupils, not according to age or grade in school, but according to gymnastic proficiency, and in that manner he is able to get the best results, keeping no one back who should advance, and advancing no one who should be kept back.

In the boys' schools, military drill forms part of the physical education, and for that reason in the early fall and late spring this form of exercise takes the place of gymnastics for the larger boys, whose previous training enables them to carry guns without injury to themselves. No special teacher is engaged for this, as the teacher of gymnastics usually is or has been an officer in the army. If he is not, he has acquired a knowledge of drill while a pupil in the Central Institute.

When the boy graduates from the high school, he either enters college or takes up some practical profession, and from that time, gymnastics are no longer compulsory for him. For the college student, exercise is provided in the college gymnasium; for the business man, in the gymnastic associations to be found in all cities of any importance throughout the country. In the universities of Upsala and Lund, we find on the facu ty a "fencing-master", whose duties are to furnish instruction in gymnastics and fencing to those students who wish to avail themselves of the privilege. But he gives no normal course as part of the college curriculum, so it should be understood that a Swedish college degree does not include gymnastics. In this country, it is a common error to suppose that every Swede must necessarily be competent to teach gymnastics, but unless he has the diploma of the Royal Gymnastic Central Institute, he occupies the same position as the physician without a degree.

The gymnastic clubs found in the various cities are usually composed of men of exceptional gymnastic skill, men who love gymnastics; and they are taught by the very best instructors the country can produce. In the club gymnasia, like that of the "Stockholm Gymnastic and Fencing Club," where in 1884 I had the honor to be instructor, one finds that Swedish gymnastics cover a very broad surface, for here those exercising are confined no longer to the apparatus belonging to Swedish gymnastics proper, but the round horizontal bar, the dumb-bells, Indian clubs, etc., are quite extensively used; and an American might say, when looking at the exercises, that those were American gymnastics. The fact is, however, that Swedish gymnastics are a system of movements, not of apparatus; and that any kind of paraphernalia is allowed in the Swedish system, provided it is used on the true gymnastic principles. That is, we use the movements in their proper progression, and thus can apply all of the *materia gymnastica* as we need it.

To provide teachers in Sweden there is a normal school of gymnastics, the Royal Gymnastic Central Institute in Stockholm, which school has been called by Dr. Hartwell "the finest of its kind in the world." Not long ago it was the only school of its kind existing, and it still remains the only one in Sweden, where it is possible to gain a certificate as teacher of gymnastics. This institute admits to its normal course a limited number of men and women, about twenty of each every year. To enter, one is required to present a high-school certificate or to pass an examination to prove the possession of an equivalent amount of knowledge. Men and women have all their lectures and exercises separate. The complete course for women is two years; that for men is divided into three sections: one year for instructors of gymnastics for the army; two years for teachers of gymnastics; and one year additional for those who wish to devote themselves to the practice of medical gymnastics; making three years for those who wish to obtain the complete diploma and the degree of the school.* The degree given is "*Gymnastik-Direktor*," or Master of Gymnastics. More commonly, however, the graduate is called "*sjukgymnast*" or medical gymnast. The course includes the complete theory of gymnastics, anatomy (with dissection), physiology, hygiene, kinesiology, pathology and various minor branches as practical instruction in all branches of gymnastics. In order to provide material for those who wish to fit themselves to be teachers, the children from several schools use the gymnasium every day during the week, and the normal-pupils of the second year's course serve as teachers. This is one of the best features of the school; for the graduate then becomes not only a storage-battery of theory, but a teacher of practical experience as well. Each pupil has a number of children for whom he is responsible, and he takes his turn in handling the whole class of one hundred and fifty or more. The experience he thus gains enables him to take charge of the large classes he is expected to handle in the public schools. In the medico-gymnastic department, several hundred persons a day are treated by medical gymnastics; and during the third year's course, the medico-gymnastic students are obliged to assist in applying the movements to the sick, in order that they may gain experience before receiving their diplomas.

No one can apply for a position as teacher of gymnastics in the public schools of Sweden, unless he is a graduate of the institute, or at least has taken its two years' course; and no one can receive a license from the board of health to practice medical gymnastics unless he holds the degree of the institute. Physicians are excepted from this last statute; but as their degree does not include gymnastics, they must take the course of the institute if they wish to teach gymnastics. At the medical schools in Upsala and Lund there is arranged an elementary course in medical gymnastics for medical students, but as the whole course only lasts about eight weeks the physicians who take up massage as a specialty go to the Central Institute. The elementary instruction just referred to is by no means a normal course of gymnastics, as it includes only the practical application of the medico-gymnastic movements. or the merely mechanical part of massage.

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*Up to date, this is the only school in the world giving a degree for gymnastics.

In the training schools of the army. there are elementary normal courses of gymnastics, so that the non-commissioned officers shall be able to give instruction under supervision of the regimental teacher, who must be a graduate of gymnastics.

To provide for the backwood-towns, where money is scarce and a graduate cannot be hired, the "seminaria" furnish elementary courses in gymnastics' enabling the teacher in the "folk-schools" to apply elementary gymnastics in an intelligent manner. Yet it should be understood that these teachers are not considered as teachers of gymnastics.

The director of the Central Institute has for one of his duties to supervise the instruction in gymnastics of the whole country; and for this purpose he travels from city to city, and appears upon the scene most unexpectedly. If the teacher in any place is found incompetent, he is discharged without further ado; and if he wishes to continue as a teacher he must take a post-graduate course before applying for another position. This supervision keeps the standard very high. as no one wishes to be disgraced by a discharge. It also causes uniformity of method, as the supervisor has it in his power to order any change he sees fit. The quality of work secured is exceedingly good.

As for the system taught. so much has been written about it, that I will simply call attention to the following points:

The exercises are chosen for their physiological effects. so that only such are used as are needed for a desired result; all of doubtful or injurious effects are excluded. The development of the respiratory organs being of prime consideration. no movement is allowed to interfere with free respiration, and the utmost care is taken that the exercises should produce a proper carriage of head and thorax. As the movements are practised for their effects on the body—not on an audience--we do not drill. drill. drill the pupils on a certain movement so as to teach them the "trick" of it, but take each one's ability into consideration, even though we consider that the form of the movement is of utmost importance.

All the exercises are executed to words of command, as that is the only method by which the pupil is enabled to concentrate his whole attention upon one thing at a time. all other methods, such as memorizing. imitation. the use of music. etc., causing him to think of one thing while doing another.

The progression is very strict, so that the exercises not only grow from lesson to lesson, and are made to conform to the differences of age, sex, strength, nationality, etc., but also that there is progression in every day's lesson. Practical investigation having proved that the exercises could be made stronger, their effects more complete and progression, more rapid if a certain order were observed in every lesson, this order was made the basis for the classification of the exercises. Thus our movements are grouped as 1. Introductions, 2. Archflexions, 3. Heaving-movements, 4. Balance-movements, 5. Shoulder-blade-movements, 6. Abdominal exercises, 7. Lateral trunk-movements, 8. Slow leg-movements, 9. Jumping and vaulting, and 10. Respiratory exercises, each lesson containing one or more from each group in the order enumerated.

The system is rational, for there is a scientific reason for everything that is adopted and used; and it is practical for it is independent of apparatus. It can be applied anywhere and everywhere. The old-fashioned idea that a bath is a necessity after every lesson in gymnastics has been discarded, thanks to a proper use of respiratory exercises; for by providing a greater elimination of water through the lungs, the skin-evaporation does not increase to any marked degree; and no excess of perspiration occurring, there can be no need of a bath to prevent taking cold.

The system is one of exercises and not of apparatus; nevertheless apparatus is desirable and hence a gymnasium is a much-needed addition to every school. For although good results can be attained by free exercises applied in the school-room, the best will never be secured until gymnasia are provided. This is not only because of the greater variety of movements that can be given in a gymnasium, but also because a gymnasium necessarily calls for a special instructor, one who has made gymnastics his profession. Even if a gymnasium cannot be provided, a special teacher is desirable; for a teacher who teaches all branches cannot be expected to be an expert also in gymnastics, a science requiring a special training and a natural aptitude if the best results are to be obtained. It will also be found that the exercises will furnish more recreation, if a special teacher goes through the classes once a day and applies the movements, for the children often get tired of seeing the same teacher all through the day, and do not give him the same attention as when they have had the relief of seeing some one else for a while. The exercises thus provide a change, not only physically but mentally.

III.—THE CHIEF CHARACTERISTICS OF THE SWEDISH SYSTEM OF GYMNASTICS.

READ AT THE CONFERENCE ON PHYSICAL TRAINING, HUNTINGTON HALL, BOSTON, MASS., NOV. 29, 1889.

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If a chemist were called upon to explain in a few words the general contents of his science and how it differs from other sciences, he probably would refrain from trying such an experiment; for his dilemma would be the same as mine to-day; he would hardly know where to begin and how to select from such an abundance of material. The fact is, that to understand fully the Swedish system of gymnastics, or any other that has any righteous claim to the prefix "system," it is necessary to be thoroughly conversant with the principles that are fundamental to all gymnastics; it is a knowledge not to be gained in a few minutes, nor to be explained in a few words. Yet I will attempt to state briefly in what respects the Swedish method differs from the others.

The Swedish system of gymnastics, devised by P. H. Ling in the beginning of this century, was already at its birth founded upon the laws of nature and upon the laws of the human organism. Since the days of Ling the system has been much perfected and improved by Ling's followers, who have made it keep even pace with the progress of those sciences upon which it is based. For that reason the system is not altogether as antiquated as some of its antagonists would fain have the uninitiated think; and the fact that it has survived in a country where nothing is done in a superficial and irrational way ought to be a guarantee for its efficiency.

First let us consider how the exercises are selected.

The exercises are chosen according to their *gymnastic value*, which quality depends on how the movement combines the utmost effect on the body with simplicity and beauty of performance. Only such exercises are used whose local and general effects are fairly well known and proved to be needed by the body. Not only the needs of the individual, but his abilities as well are to be taken into consideration; and for that reason the teacher must know how to vary the exercises according to the degree of physical culture possessed by the pupil. The movement should have its developing effects in a short time; it should be simple so that every pupil can do it fairly well; and it should have beauty of execution according to each one's ability.

In order to supply the needs of the organism and to develop the body harmoniously, the exercises have to overcome a great many tendencies to faulty growth or bad posture; and the *greater or less value* of a movement depends on its power to counteract or correct these tendencies. It naturally follows that the system uses no exercises which would encourage such faults (for instance, using chest-weights for beginners, etc,) If an exercise gives rise to faulty posture, it is discarded, or at least postponed till some future day when it can be correctly executed.

In accordance with the physiological truth that the first, greatest, and most extensive effect of exercise is on the respiratory organs, and that hence, during exercise. these organs must be allowed perfect freedom of motion, the Swedish method disapproves of and discards all movements which compress the chest, (such as Indian club swinging), or which in any way interfere with free respiration, and the greatest attention is given to the proper development of the chest. In recognition of the fact, that to be truly strong a man must know how to breathe well. much prominence has been given to "respiratory" exercises. "Breathe!" "Don't hold your breath!" are common exhortations in gymnasiums where this method is used.

In judging of the effects of an exercise, we think the least of the muscular development produced; for the effect of *all* general exercise is to develop muscle, and this aim is reached without especially working for it. But we think all the more of the effects produced on nerves, vessels, etc., for the results in this direction can be vastly changed by varying the movements (as demonstrated in Medical Gymnastics); in other words, the exercises have been made to harmonize with the laws of physiology. How this is done will be understood from the description of the exercises which are contained in each lesson (to which I shall soon refer).

Measuring a man's strength, we compare the man to himself; we do not say that a man is strong because he can hold so much air, or because he can lift so many pounds, or because he can jump so high. But when he possesses a healthy, well-balanced and well-proportioned body, which his will has under good control, then he possesses physical culture, even though in the eyes of some he may seem weak as compared to others. It is this health, symmetry, and harmony we aim at in selecting the exercises; and that the Swedish method accomplishes its purpose has been too well demonstrated to leave room for doubt.

Movements are never chosen "because they look so pretty"; for educational gymnastics do not aim at beauty of performance. When gymnastics do have such an aim, they are called "æsthetical," and these have but little effect toward physical development. And yet we claim that when a movement is well done it is graceful as well. Some persons mistake a languid manner of motion for grace, and hence claim that the Swedish exercises "are too jerky to be graceful." It is to be remembered that all gymnastic movements are not slow, nor do they have an even velocity; there are some that can and always should be done with great and accelerating speed, and you can move quickly and yet do it gracefully. By making the component motions of movements like the arm-extensions merge into each other in a "graceful" manner, the effect of the movements is completely lost. On the other hand, if exercises like leg-elevations, backward-flexions of the trunk, etc., are done in a "jerky" manner, these movements are incorrectly executed and have lost their best effects.

Our second point for consideration is the regularity of method.

In order that gymnastics be systematic there must be progression. In the Swedish method this is adhered to very strictly, so that the exercises, beginning by the very simplest, gradually become stronger and more complicated. So closely has the effect of movements on the human organism been studied, that the slightest change of position—even the turning of a hand—has its recognized influence in the progression; and it is here that the system demands the most from the teacher: without a good knowledge in this direction he becomes worse than useless. No movement is attempted unless the previous ones of *the same kind* have been thoroughly practiced; and no exercise is used whose commencing position has not already been practiced sufficiently to guarantee its correctness; for, if the commencing position is faulty, the movement cannot be rightly executed.

The Swedish method does not disapprove of chest-weights, dumb-bells, and allied forms of apparatus; but through *years* of constant practice it leads up to them, claiming that before increasing the weight by external means, you should make a progression by prolonging the lever of the weight already present. So, for instance, a backward-flexion of the trunk with the arms extended upward and the hands holding weights must necessarily be preceded by the same movement without the weights, and that by a flexion with the hands fixed behind the neck, and still earlier with the hands on the hips, etc.

In a like manner the method prepares the way for æsthetical gymnastics, for fencing, military drill, and other forms of applied gymnastics, yet insisting that educational gymnastics form the basis of all these. This is reasonable; for, unless you have learned to control the involuntary coördination of motion, which is the cause of "faults" in gymnastics, you will hardly be able to produce the great voluntary coördination required in all forms of advanced gymnastics.

Now, when you are to put this progression into practice, you will not feel as if groping in the dark; for, in this method, the movements have been thoroughly systematized and included under distinctive headings, where there is no more a jumble, but where the rules of progression can be well carried through by a teacher familiar with the theory of gymnastics. After years of practical investigation, it was found that if, in every lesson, the exercises followed each other in a certain, comparatively unchanging order, the movements could be made stronger; they could be given more duration; ill results could be completely prevented; and hence the good effects became all the more pronounced. For that reason all movements were divided into classes, and this order was made the basis for the classification. All the exercises can be included under the various headings; and within each class—with infinite variety—the exercises grow gradually stronger as the pupils develop.

This classification will be found not only to contain exercises filling the needs of the organism, but to correspond to physiological principles as well. To understand this we shall have to consider it a little in detail.

(1) *Introductions.* By these we understand some simple exercises used at the beginning of a lesson, to gain general muscular control; to correct the base and general position, etc.

(2) *Arch-flexions*, which consist of backward-flexions of the trunk; they have the effect of straightening the dorsal region of the spine; of vaulting the chest forward by drawing the lower ribs apart, thus increasing the chest-capacity; and of cultivating the extensibility of the upper region of the abdomen.

(3) *Heaving-movements*, which consist of various exercises in a hanging position, and others that have the effect of expanding the upper part of the chest by lifting it upward; incidentally they also develop the arms. If these movements are not preceded by the arch-flexions they will produce lameness in the upper region of the abdomen. Free-standing arm-extensions are classified in this group, since their effects resemble those of heaving-movements, for which they also prepare the way.

(4) *Balance-movements* The two preceding exercises are strong, hence they increase the heart-beat noticeably. Now a rest ought to ensue,—the word *rest* not to be understood as meaning inactivity, but changed activity,—and the time is conveniently filled by the gentle movements which we call balance-movements. These require but little effort from any one of the many muscles brought into play; the heart-beat is not increased by them, but it becomes lessened by the mechanical propulsion of the blood into the legs (the more equal distribution of the blood-pressure). At the end of a balance-movement the pupil is again ready for more specific work.

(5) *Shoulder-blade-movements* consist of arm-movements which have the effect of placing the shoulder-blades in correct position. These exercises are in a measure dependent on arch-flexions and heaving-movements; for, unless the dorsal region of the spine is straightened, and the upper region of the chest is extensible, but little can be done toward overcoming a "stoop."

(6) *Abdominal exercises* bring into forcible play the abdominal walls; their effects are to incite peristalsis, to promote digestion, and to shorten the stay of the food in the intestinal canal.

(7) *Lateral trunk-movements* consist of rotations and sideways-flexions, etc., of the trunk. They have a far-reaching effect on the general circulation

by accelerating the flow in the inferior vena cava, leading the blood off from the abdomen and legs, etc. Incidentally they also expand the chest laterally and strengthen the muscles around the waist.

(8) *Slow leg-movements.* By this time the heart-beat is again much increased; slow leg-movements furnish a means of lessening it. For, by these the blood becomes mechanically propelled forward, through the forcible, passive extension of some muscles, while others are in gentle active contraction. These movements may be conveniently omitted, when the previous exercises are not strong enough to make them a necessity.

(9) *Jumping and vaulting.* These exercises have the effect of cultivating the general elasticity of the body more than does any other form of movement. And if we recall that grace and elasticity are very nearly identical in gymnastics, we understand the gymnastic need of these movements. But they also have practical value; for we are often called upon to jump; and if it so happens, it is well to know how. They develop courage, self-reliance, a true appreciation of space, and produce great ability of voluntary coördination of motion as well. The Swedish method differs from all others (not founded on it) in its manner of preparing for the jumping by practising the intermediate positions, before the real movement is attempted, as well as in demanding that correct "landing" should be insisted upon. In a like manner the vaulting is prepared for by first cultivating in the pupil the habit of clinging to the bar, no matter what happens, before he is made to leap over it. And the progression is so strict, that we have no accidents to record in these "violent" or precipitate movements.

(10) *Respiratory exercises.* These consist of deep inhalation and exhalation accompanied by some arm-movement that will expand and relax the chest in even rhythm with the respiratory act. The movements, which can be conveniently combined with some movements of the legs or trunk, have the effect of restoring free respiration (the jumping putting the pupil out of breath) and to lessen the heart-beat. Respiratory exercises are brought in not only at the end of every lesson, but at any time when their effects are needed, and often also at the beginning of a lesson containing strong exercises that require an increased amount of oxygen.

To this daily curriculum various additions are often made, such as to bring in one more shoulder-blade-movement, when needed; or another heaving-movement; or an abdominal exercise; or to leave the last one entirely out for children, and so on—as the teacher may decide.

In addition to the free-standing movements, each class contains numberless exercises on apparatus, and supplies a sufficient number to form a progression from early infancy to well-developed manhood—through all the grades in school and college, and in after-life as well.

The third point in which the Swedish system differs from the majority of others is in the method of applying the exercises.

The movements are applied to words of command, this being the only method enabling the pupil to concentrate his mind on one thing at a time, that thing being his own movement. This is in accordance with the definition of gymnastic movement, which tells us that, unless a movement is done with full volition, it ceases to be gymnastic. In those methods which use imitation, memorizing, etc., the movements become mechanical, the pupil dividing his attention between himself and something outside him, *i. e.*, they cease to be gymnastic. Objections have been raised to using words of command, because "it is too tiresome, ' "too soldier-like," etc. To this we can answer, that to get the full recreation and rest out of exercise we should put our whole mind into it, this being much less tiresome than to exercise while we think of something else. On the one hand we have the theory of a small minority of antagonists, that gymnastics without music do not give enough recreation, especially to children, because there is not enough exhilaration in such exercises; on the other hand we have the statement of a large majority of children and others who have tried gymnastics to music as well as to words of command, the children saying that there is "much more fun" in the latter, and the adults that there is "much more to them." As for the second objection, we claim that discipline is necessary not only for a soldier but for everybody, if we are to have any control whatsoever over ourselves; and hence discipline should form a part of everybody's education. Words of command have other advantages. They teach the pupil to think quickly; to act as quickly; and to do a thing in the shortest possible time. This is no little gain in the present age of hurry and competition. Besides, the use of commands enables the teacher always to keep his class "in hand"; it becomes easier for him not only to teach, but to correct as well.

The Swedish method disapproves utterly of the use of music, for the very simple reason that but few gymnastic movements are rhythmical, and cannot be made to be so without sacrificing the movement. On the other hand, every gymnastic movement has a rhythm of its own, which, however, distinctly differs from the rhythm of music. If music were to be used, its rhythm would have to change at every motion, and I doubt if any player, even a Rubinstein, would be able to make it do so. Take, for instance, such a movement as "preparation to jumping" (consisting of 1. Heel-elevation. 2. Knee-flexion. 3. Knee-extension. 4. Lowering of the heels); the first motion is exceedingly quick; the second moderately quick; the third comparatively slow; and the fourth still slower. Now, where is the music to fit such a movement?

A recent lecturer on gymnastics made the somewhat startling statement that "the arm-movements are not gymnastics" (for example: arms extended sideways, in front, above the head, etc.) If that teacher had said "arm-movements done to music are not gymnastics," the statement would have been correct. For let us investigate these arm-extensions. Starting with arms hanging down, they consist of flexion upward of the forearm, a movement occurring slowly from beginning to end,—if it is to be done correctly,—and extension in any direction, which movement, once started, occurs with great and accelerating speed. Now, if this is done to music, the flexion takes place so quickly that the forearm rebounds and gives the intermediate position of semi-flexion instead of complete flexion. In consequence thereof the extensors are not in the state of complete relaxation which should exist before they are made to contract, and their contraction will not be as forcible nor as quick as it ought to be. Besides, the music will give it the same speed as it gives to the flexion, which is entirely wrong. In most flexions a great many comparatively strong muscles perform the motion, hence these movements must occur slowly; whereas the extensions are executed by few and comparatively weaker muscles, hence they can and should occur more quickly than the flexions. This is especially evident in the arm-extensions just mentioned, and when they are done to music, their gymnastic form always has to be sacrificed, *i. e.* they cease to be gymnastics. In a like manner we could investigate all other gymnastic movements and with the same result in all except a few oscillatory movements, like walking, running, etc.

Besides, when exercising to music, the pupil will be found to pay more attention to the rhythm of the music than to the form of the movement (if we assume that the latter could be made rhythmical), and we get the same result as in all cases where work is done with divided attention—one of the things has to be sacrificed for the other.

From the above it will be seen that the system is *rational*, since it seeks a reason for everything that it uses or adopts: it makes theory and practice harmonize. But it is *practical* as well; for it does not rely on elaborate apparatus for existence, since the exercises, not the apparatus, constitute the system. The movements can be taken anywhere where there is sufficient floor-space to stand on and sufficient oxygen in the air. On the other hand, though the system prefers its own apparatus, the exercises can be most easily adapted to apparatus belonging to other systems, or to such simple means as ordinary chairs and desks, or other furniture. Though apparatus is desirable, it is not absolutely necessary for good physical development, especially in gymnastics for children.

Whatever its deficiencies, the system has not only survived on its own merits, in spite of the close scrutiny to which it has been subjected by gymnastically learned men all over the world, but it has finally been adopted in every country where its principles have been thoroughly tested, even conservative England having at last yielded.

Before closing, I take occasion to warn you against confounding Swedish Educational Gymnastics with Medical Gymnastics, commonly known as "Swedish Movement Cure". Although based on the same principles, the two are entirely different, not only as to their purposes, but in the exercises used as well.

IV.—MODIFICATIONS OF THE SWEDISH SYSTEM OF GYMNASTICS TO MEET AMERICAN CONDITIONS ?

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Educators of to-day recognize that there are certain fundamental principles which must form the basis of all good teaching, whether it be of one branch or another and that we are surely passing out of the era of systems and text books. The methods of teaching now in vogue have been born in the light that science has shed upon our conception of the needs and possibilities of human nature; to be a true educator, the teacher of to-day follows no set form, no ready-made "system," but applies the laws which Nature dictates; his effort is to make men and women, not puppets with a smattering of useless book-learning. His method varies with his classes, and text books become merely tools to assist in making the framework around which mind and character are built.

Since body is the basis of human nature, and not least of that portion called the mind, it seems reasonable to assume that the education of the body must follow laws quite as definite as those relating to the mind, and that all physical training must be based upon the laws of Nature, and not upon any arbitrary or artificial considerations. The principles of gymnastics must of necessity be the same the world over, and the so-called systems must become very similar to each other, if they are built on the same leading laws. Physical education has reached a new era: one where the word "system" with its diverse prefixes of nationality will disappear, and where the teacher will cease to feel the handicap of restricting superscriptions. Sciences and arts are cosmopolitan, not national; so the science of gymnastics and the art of applying it must belong to the world at large, even though it happens that its foremost investigators must claim one section of the earth as their native land.

In Sweden a new science was evolved by Ling and his followers, who named it Kinesiology (*Kinesis*-motion), which in free translation means the science of gymnastics. It embraces the principles which are fundamental to all exercise, whether medical or educational, German or Chinese, and its contents might be best expressed thus:

$$\text{Kinesiology}\left\{\begin{array}{l}\text{The Mechanics}\\ \text{The Physiology}\\ \text{The Philosophy}\\ \text{The Classification}\end{array}\right\}\text{of exercise.}$$

It is based upon the three-fold nature of man, viz: the machine, the organized body, and the thinking individual. It demonstrates how bodily movements are affected by the laws of physics, physiology and psychology, and how exercise may influence these laws. Upon the laws of life as described in general kinesiology, the Swedes have based their gymnastics, building their theory upon practical experience. So it happens that when *correctly* taught, Ling's system is not merely Swedish, but it is *gymnastic* in the broadest sense of the word, and thus *Swedish* gymnastics merely stands for *rational* gymnastics.

I have no hesitation in saying that, before long, all gymnasia in this country will have quite a Swedish atmosphere, and that even now, in many, the exercises are already showing symptoms of "Lingœmia," even though the instructors may be unconscious of having been contaminated,

It is true that scientists from everywhere have added material to the general knowledge of the subject of gymnastics, but the quantity and quality of their contributions are disappearingly small when compared to the achievements of the Swedes, and certainly their systems of gymnastics are often and unmistakably at variance with the laws of Nature. To gather a few ideas from Swedish gymnastics, a few from the German, a few from some other source, and shake them up together may be systematic, but it is not rational, and certainly can not be any improvement upon these ideas which have been arranged in scientific sequence, the evolution of decades of research. "Science is organized common sense," not systematized nonsense, and those teachers who begin by modifying scientific gymnastics will end by modifying their "own" systems to correspond to the one modified. This might be conveniently expressed like this: John Smith's system: Swedish system: John Smith's theory: general kinesiology. It is hardly necessary to prove this theorem. The contest to-day is essentially between the "empiricism, personal pride and professional prejudice of John Smith on the one side, and scientific exercise on the other. Swedish Gymnastics contain "the good from all sources," but would cease to be scientifie if all the useless *possibilities* of exercise were added.

General kinesiology teaches that movements should be chosen for their effects upon the one exercising, for development or correction to meet his needs; or for classes, to correspond to the requirements of the average of the class. If an exercise violates any of the laws of physics, physiology or psychology, as related to bodily movements, it is discarded. These rules are fundamental in Swedish gymnastics, and must become so in any gymnastics. It will then happen that all the possible will not be used in physical training, but only such movements will be applied as are distinctly useful; and no gymnast will waste his time on movements of doubtful or indifferent effects, not to mention those which are distinctly harmful or merely pretty.

The Swedes exercise for the sake of the body, not for the sake of the apparatus, hence the latter is made subservient to the exercise; and the system is one of movements where the chief apparatus is the body itself. When external appliances are needed to produce more volition or more exact localization, they are made to fit the movements, not *vice versa*. It was in this manner that the Swedish apparatus was evolved; and it was in accordance with such principles that the movements were classified according to gymnastic effects into arch-flexions, heaving-movements, (not "arm-movements"), balance-movements, etc., embracing the typical forms of all exercise, not in Calisthenics, Apparatus Work, Wand Drill, etc., since the latter classification embraces within each group exercises of the most dissimilar effects, and hence to an educated gymnast means practically nothing. Whether bending backward with the arms free above the head, or holding a pair of dumb-bells or a wand, or grasping a stall-bar, a pair of breast-bars, the uprights of the parallel bars, or a vaulting bar of Swedish or of German model, the movement, when correctly executed, is an arch-flexion, giving the effects peculiar to that class of exercises, and as such is recognized by general kinesiology; and it has not ceased to be Swedish as long as it is applied in its proper place as an evolution of preceding movements.

If you draw yourself up on a machine that you call horizontal bar, heaving-board, *bom*,* flying rings, high parallels, etc., or if you use a giant pulley in a corresponding manner, you have in each case done a heaving-movement, if the form of execution was correct, and even the most rampant Swede will be obliged to admit that there is nothing un-Swedish in any of those exercises. If in Swedish gymnasia no flying rings or chest-weights are to be found, it is because the Swedes do not need them. If, on the other hand, a trained Swede has to teach where he finds no Swedish apparatus, he uses whatever is at hand. He can use a school desk of American make just as readily as one of Swedish make without having to Americanize his movement About the chest-weight a curious fact may be mentioned: it was invented to substitute the operator in giving resistive movements, and this kind of movement is peculiarly characteristic of Medical Gymnastics, as revived in Sweden and exported to America. Whether the chest-weight be an improvement upon the original means of resistance is at least questionable. The machine is American, but the movements done upon it are not necessarily so.

The laws of progression—the kernel of general kinesiology—have been thoroughly elucidated by the Swedes, and if others are tardy in adopting and applying them, it is not because of their knowledge of these laws. The principles of progression are direct conclusions from the laws of physics, physiology and psychology, and must necessarily obtain whether exercises are called by one name or another. In accordance with these laws, the Swedes have assigned definite places for all exercises and apparatus, and while some of them may deny the need of chest-weights, Indian clubs and parallel bars, etc., they are careful to affirm their usefulness when handled on correct principles—or

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*A Swedish word meaning thick bar—boom; the thin Swedish bar is called "hafplanka," which literally means heaving-board.

Swedish principles, if you so wish. "It is characteristic of Swedish gymnastics to be able to make good use of poor apparatus. The apparatus as such does not thereby lose its bad qualities." (Törngren).

The Swedes maintain that while human nature may be the same the world over, yet different nationalities have distinct characteristics, both physical and mental. Consequently while the leading principles for applying gymnastics will be the same for all, the details of some movements and the progression must vary somewhat to correspond to these differences. Ling, Jr., meant something when he said that "nationality must influence progression," and his idea was somewhat similar to the Swedish rule about gymnastic games, to "select games familiar in your locality, familiar to your pupils, and modify them to correspond to gymnastic principles." Mark well it is *gymnastic games*, not American games, German games, nor Swedish games; so it should be *gymnastic exercises*, not American, German or Swedish exercises. The Swedes are too progressive to often use the antiquated dumb-bell (the oldest known gymnastic apparatus); they dislike the exercises with Indian clubs, chest-weights and flying rings, and hence exercises with such apparatus, though used, are not popular in Sweden and never will be—perhaps because as a Boston woman said "those movements seem silly and useless when you have tried the others." But wherever movements on such machines are popular, the Swedish teacher who is thoroughly imbued with the spirit of Ling, the spirit of gymnastics, will use them, letting himself be guided by the law, however, that no movement should ever be used for its own sake, but for the sake of its effect upon the one exercising. This modification, according to externalia is inherent in the Swedish system itself, and makes it none the less Swedish; for it certainly is gymnastic and in accordance with Ling.

The Swedes recognize that individuality influences exercise; they do not believe that any one set form will fit all classes, ages and individuals, but maintain, that, before you arrange your movements, you should study your pupils from a psychological point of view. Necessarily the exercises will vary somewhat in different lands, for mental characteristics differ in different nations. Hence gymnastics taught in America may not look exactly the same as when taught in Sweden, even if applied on the same principles.

The following statements may serve further to elucidate our subject of consideration:

Col. Gust. Nyblœus, late Director Roy. Gym. Cent. Inst: "Gymnastics in itself is neither Swedish, French, English, German nor Finnish, it is international in a broad sense. For that reason, in this branch, one should avoid all *chauvinisme*, and boast as little with the name Swedish as abuse the name Ling to shelter one's own more or less correct views"—"Since organic life eludes the degree of mathematical precision which one can force upon inorganic matter, the effort, nevertheless, to enforce it upon the former easily becomes pedantic humbug with the name of science. This is especially true of gymnastics, where precision neither of form nor of time of movement can be driven to the extreme."

Capt. V. G. Balk, Prof. R. G. C. I., and *Lieut. O. Schersten*, Teacher R. G. C. I., in their book on gymnastics, referring to the wand: "A good addition to the exercises as a change and a more powerful interpolation in the free movements. The use of the wand has for its object to make the movement stronger by adding weight to the lever"; and referring to the dumb-bell: "They may enter with good effect as an adjunct in the ordinary gymnastic lessons. Without doubt this kind of gymnastic exercise is of great value, if good forms are selected."

The late *Prof. Hjalmar Ling* said: "A really ideal conception leads to a constant effort toward and preference for a certain *selection* of the most perfect and complete forms within every important type. But it does not exclude the teacher's duty, out of compassion for the inability of a crowd of little and clumsy pupils, humbly to use all the means which in the shortest possible way can improve the condition."

"Every movement, sufficiently exact as to form and known as to effect, which plainly corresponds to an essential need, is beautiful in itself, through its useful purpose."

"It has been said with justice that the stumbling stones of the gymnast are the vanity of the rope-dancer, the affectation of the dancing-master, the rigidity of the soldier."

"No apparatus, not even the most inconvenient, is harmful in itself if it is correctly used; without the teacher's more or less skilled hand for guide, *i. e.*, for correction, assistance, resistance, etc., there is no single piece which is absolutely necessary and entirely impossible to substitute under all conditions."

"It is not enough, as has been supposed, that a movement should be *harmless* in order to receive gymnastic consideration."

In conclusion let me state in behalf of Swedish gymastics, that

1. We believe that the laws of Nature should form the basis of all exercise and that nothing should be introduced (*a*) which is at variance with these laws, and (*b*) whose value remains to be proved.

2. We believe that the laws of exercise as evolved by the Swedes are essentially correct for they have been proved by experiment. We shall adhere to them until we have satisfactory evidence that we are wrong; but we can accept no statements which are not borne out by science; all such we are ready to adopt and incorporate into the science of gymnastics.

3. We believe that while the leading laws have been framed correctly, much detail remains to be added—not by arbitration, but by the commands of Nature. As the science of gymnastics grows we propose to grow with it, along the lines of physics, physiology, and psychology, Meanwhile we take pride in the conviction that it was born in Sweden.

4. We do not believe in modifying the Swedish system, for it is in itself a modification—its elasticity is as great as the tenacity which has enabled it to survive three generations of investigators. Neither do we believe in modifying any other system, nor in inventing a new one to meet American or other conditions. Gymnastics is a science and demands to be treated as such. And the scientific world demands that no one attempt to modify anything before he understands the thing itself. And we beg that those who adopt a few movements, label them "Swedish gymnastics" with various surnames, and inflict them upon all alike, will do us the favor to eliminate the word Swedish, for looks and name do not constitute character.

5. We believe that the demand of the times is not for a particular system or form, but it is one for good teaching. It is demanded that each physical trainer should possess a thorough knowledge of the principles and practice of gymnastics as a science and an art, and that he should know how to teach. What he is to teach let him decide for himself as long as he produces the correct results. Then the rivalry will be one not of factions but of skill, and we may justly look for the best results. The untrained and unskilled teacher has had his day; he has taught us what not to do.

6. We do not ask that anyone adopt the Swedish system, but we demand that all should teach rational kinesiological gymnastics, and that all try to drop personal vanities and narrow prejudices, and by recognition of our own imperfections absorb of the vast infinite to aid us in shaping the definite for which we are working.

Let us vie with one another to produce the best; let it be a peaceful competition where each will delight in the other's success, and improve by it; and let us remember that energy cannot afford to be misspent nor time to be wasted.

V.—AMERICAN (?)GYMNASTICS.

(*Reprinted from* POPULAR EDUCATOR *Oct.* 1893.)

To the Editor of the POPULAR EDUCATOR:

In a recent issue of your paper I noticed a heading "Progressive American Gymnastics" and my interest was at once excited since we have been told by Dr. Hitchcock, Sr., Dr. Hartwell and other leading American teachers, that there was no such thing as an American system of gymnastics.

Highly pleased with the introductory part of the article, I became somewhat surprised to run up against a familiar expression: "First Day's Order." A day's order in American gymnastics! Let us see how it differs from the Swedish. This was the sequence of exercises: 1. Attentive exercise. 2. Exercise for the lower part of the chest. 3. Upper chest exercise. 4. Balance movement. 5. Shoulder-blade movement. 6. Waist muscle exercise. 7. Slow leg movement. 8. Preparatory jumping. 9. Breathing exercise. And there was no difference except in the names used; the movements themselves were the same as the Swedish, with the exception of the "Hips firm," which, according to the illustrations. was to be performed in the same incorrect manner as in the Boston public schools.

Now this sequence of movements was the invention of P. H. Ling and it is the very essence of the Swedish system. its one undisputed characteristic, the only real difference between German and Swedish gymnastics is the sequence of exercises. the daily progression; for a multitude of the movements are identically the same. But continuing the reading we are told that the exercises are to be done to music. Ah! Here at least is something that is not Swedish, but this statement is followed by "The children must not be made to keep time to any music. The pianist must keep time to the children. The music—if it is not rightly conformed to the exercise it is absolutely harmful." The Swedes object to gymnastics done to music only because the rhythm of the music differs from that of the movements, but they never objected to music done to gymastics; only that then the music. syncopated, cut up, made up of long pauses, followed by sudden clashes or interrupted notes cannot be called "music" any longer, but rather a substitute or duplication of the executory commands. The difference of execution in exercises to music and in those without, is great, but that between exercises to such music and to none at all, hardly exists. Hence, since the execution as well as the sequence of the movements are the same, Swedish Gymnastics and "Progressive American Gymnastics" are identical. Thus Miss Narey pays a delicate compliment to the Swedes by leading us to infer that the American gymnastics of the future will be Swedish gymnastics taught in America.

Still as we have observed similar articles in England which have led to much controversy and animosity, we would suggest that scientific teachers of to-day, be they Americans or Swedes, call their science merely *Gymnastics*. for it is an anomaly to speak of exercises as being German, American, Swedish, etc., since the correct forms will be found in all systems, even in the Chinese of 5000 years ago; and if our principles are the same, (and a science admits of very little margin.) our methods must ultimately become the same. Why, then, let national pride stand in the way of rapid progress?

VI.—SWEDISH GYMNASTICS *vs.* GERMAN.

"WHICH IS THE BEST SYSTEM OF PHYSICAL EDUCATION FOR OUR PUBLIC SCHOOLS?

By Henry Hartung."

(*Reprinted from the* POSSE GYMNASIUM JOURNAL, *July*, 1893.)

A pamphlet with the above heading has been distributed broadcast in the Children's Building at the World's Fair and has for contents a comparison between the Swedish and the German systems, recommending the latter as the better. As the author has based his statements on false premises, it is only natural that he should have arrived at wrong conclusions; and as a matter of curiosity we will introduce our readers to some of them.

Mr. Hartung says that "in deciding the question which system answers our purposes best as a practical system for our public schools, it may safely and without presumption be decided in favor of the German system." To prove this he states, 1. that "the German system really is a rational one, while the Swedish, in spite of the claims of its advocates, is only a pretended one"; 2. that, "as another point of superiority of the German over the Swedish system, it may be mentioned that it is a progressive and living system, while the other one has been put to a stand-still by the limits and principles put up for it by its founder." 3. that "the Swedish system in its general features is nothing but machine work." 4. that "it is claimed by the Swedes that apparatus work with them is entirely unnecessary in securing bodily perfection." 5. that in the Ling system, there is "an absence of moral impressiveness, of amiability, sociability, cheerfulness of spirit and encouragement towards higher aims," which qualities are claimed as definitely characteristic of the German system.

As proof for statement 1, Mr. Hartung quotes an antiquated argument by Prof. Du Bois Reymond, which, if correctly quoted, makes the professor appear as if he knew nothing whatsoever of the system which he tried to condemn. In the light of gymnastic science of to-day, the quotation is simply a marvel of incorrectness, and we should have thought that Mr. Hartung would have had more consideration for his eminent countryman. For the development of "single" muscles is the very thing the Swedes avoid, and it is characteristic of their system that a majority of its movements bring the body into play as a whole—not in parts. Prof. Du Bois Reymond has probably learned since what scientists mean by "muscular isolation," and more than likely would be glad to recall his statement.

Mr. Hartung also says with the Germans, "it is a matter of very little interest to know the effects of every exercise on every muscle or any set of muscles." So it is with the Swedes; but what about the effects of the exercises on heart and lungs, brain and nerve, and functional activity in general? We demand that our teachers shall be familiar with these effects, and we call that more rational than to use an exercise because it has been used by others, or because "it is a pretty good all round exercise," etc. Is it not rational too, to demand that teachers should be familiar with anatomy, with the mechanics of the machine they make work? If the Germans approve of the lack of such knowledge in their teachers, they must at least admit that the possession of such knowledge is not irrational.

Point two is not well taken, for the progression of the Swedish system is *endless*, and it is based on the laws of mechanics, physiology and psychology, not of 1813, but as they are to-day, and hence the system will keep on growing as those sciences become more and more elucidated. Besides, our progression is not based on gymnastic possibilities of apparatus, as is the German—for what else would you call it to hang on the flying rings and first draw up one knee, then both; first one leg, then both; first forward, then backward, etc., *all in the same lesson* and in immediate sequence? There may be system and progression in this, but it can hardly be called rational (scientific). Mr. Hartung also goes on to say that "some of the Swedish teachers confess that they have changed the old system considerably and that they do not follow the old system pure and simple," and that "if it should have been changed by the pupils of the Swedish master is it not evident that the foundation was a very poor one?" We have never heard of any Swedish teacher who wished to *change the system*, but there are those who follow out Ling's teachings to "vary the exercises according to age, sex, temperament and nationality," and to "make use of any apparatus which is at hand, provided the movements are applied on gymnastic principles." There are teachers of Swedish gymnastics who have not kept pace with the times. That an exercise is executed with a dumb-bell—a relic from the ancient Greeks; or with an Indian club—the civilized form of a battle-axe or club; or with a wand—the javelin shortened, does not make it non-Swedish, any more than an exercise is German merely because it is executed on the German parallel bars, or Swedish because it is done on stall-bars. When an exercise—no matter what—is executed in a correct manner and in its proper order according to the laws of progression, then it is Swedish, no matter what the apparatus.

Mr. Hartung also states that our system "consists of a comparatively small number of simple movements, of which the instructor must be perfectly conscious as to their effects and physical value"; but it never seems to have occurred to him that the ten groups into which Ling classified the exercises cover *all* gymnastics. There is not one exercise that Mr. Hartung might mention which we cannot place in that list and about which we cannot tell him the effects and value; for each one of those groups is a definite gymnastic type, holding many species whose general effects are the same, though some of the special may slightly differ. There are as many exercises in the Swedish system as in the German. As for our exercises all being simple, we must suppose that Mr. Hartung never saw a clsss of advanced Swedish gymnasts, unless it be considered simple to turn handsprings over a six-foot box, to draw one's self up by either arm alone, to slide down a vertical rope head first, with arms stretched out horizontally, etc., etc. In any feats of strength, courage and endurance our gymnasts can easily rank with those of any nation. Not only that, but the Swedes have no superiors in general carriage, appearance and form of movement.

About the third point we would like to state that our progression and day's order, of which we are said to be so "boastful," are something more than "a set of rules, according to which any one who, in a few weeks' course has got a superficial idea of the nature and kind of movements making up the so-called rational system, may run that physical culture machine." If Mr. Hartung would undertake to study the system, he would be surprised if not overwhelmed by the majesty of its science, by the beauty of its grace and flexibility. Is it not rather suggestive that the Royal Gymnastic Central Institute in Sweden requires a two years' normal course, while the corresponding German institution requires only six months?

Mr. Hartung also claims that "it is only with difficulty that a teacher may hold the attention of the pupils after the exercises have lost their attraction as a novelty"; but no teacher of Swedish gymnastics (as such we do not classify the self-made ones, who have merely picked up a knowledge of the system by referring to the scant literature on the subject) ever found any such difficulty, all the more since movements are dropped as soon as they become habitual, *i. e.* the novelty (interest) is gone. We can prove by actual experience that children *love* Swedish gymnastics when properly applied.

Argument four is evidently the result of a misunderstanding, for we think no advocate of the Swedish system has claimed that, without apparatus, the *same* results can be accomplished as with it; rather that for a good physical development elaborate machines are not necessary and especially not in the lower grades of public schools. (It is significant that a majority of Swedish schools are supplied with complete gymnasia.) The system commends itself as being practical, since its movements can be done without apparatus; and it certainly is rational to make a system of gymnastics one of mevements rather than one of apparatus.

Point five includes many arguments scattered throughout the pamphlet. So for instance Mr. Hartung states that "we consider our pupils in a state of debility and sickness and the exercises merely a medicine." Likewise Dr. Du Bois Reymond recommended it to "only sick persons," both he and Mr.

Hartung mistaking Swedish medical gymnastics for educational. And if Dr. Angerstein really stated that we "do not recognize in man the intellectual and vigorous being or organism, but simply a muscular system," etc., then he has utterly failed to grasp the fundamental elements of the system.

We would really like to know where in the German system Mr. Hartung finds "the moral impressiveness, amiability," etc., different from in the Swedish system, where he claims them to be absent. We are led to believe that Mr. Hartung has yet to learn the psychological effects of the unilateral, bilateral, isolated, and co-ordinated movements of the Swedish system; and of those cultivating speed, courage, resolution, etc.

In advocating music, Mr. Hartung fails to recognize that every gymnastic movement has a rhythm of its own, different from that of music. This argument has been treated in full so many times that we think our German friends are familiar with it.

As for the argument in favor of exercise requiring "none or hardly any demand from the will," psychologists all agree that any exercise which does not require full volition is valueless, both from an educational and a recreative standpoint, since attention must be active with something as long as the body is in the wakeful state, and moreover it cannot be in any way beneficial to go through a number of movements mechanically while the attention is doing something else—the "interest" is not in the exercises, so they certainly cannot be recreative.

Mr. Hartung states in his paper that the conflict between German and Swedish gymnastics came to an end in Europe some thirty or forty years ago by the establishment of the German system as the best and most practical for educational purposes. In Sweden and Norway, Swedish gymnastics are compulsory in all schools. In Finland and Denmark the school-gymnastics are based on the Swedish system and are almost identical with those in Sweden. In England school-gymnastics are Swedish everywhere, even though in some places they are known as "extension-exercises," etc., and the basis of British army gymnastics is Swedish. Only recently the French committee on national physical education recommended that the Swedish system be made the basis for gymnastics in France, and scientists and educators of all nationalities (other than German) who have thoroughly investigated both systems *all* award first prize to the Swedish system.

Without better arguments than those in his pamphlet Mr. Hartung cannot justify his claims for a system whose chief exponents thus far have been unable to satisfactorily answer the question "What are its characteristic features?" He himself has certainly not described them. We are still led to believe that German gymnastics possess (*a*)*an artificial* (non-scientific) *classification of movements*; for certainly that of "calisthenics, light work, heavy work," etc., is such, since gymnastically calisthenics include every type and degree of movement, and "light and heavy work" means nothing, since what is light for one is heavy for another, and *vice versa;* (*b*) *an artificial progression*, for such is the day's order of a "theme with variations" (for instance, a movement on the parallels with all its possible variations in immediate sequence in the same lesson); and as for the progression from lesson to lesson it consists only in doing something else, and when the same apparatus is used the same "theme and variations" reappear. The progression is one of apparatus instead of one of movements; (*c*) *an arbitrary choice of exercise*, including all that which is possible, whether it is needed as useful or not.

If the Germans can invent a system more scientific than the Swedish, the undersigned will gladly and fearlessly adopt it, for the Swedes set forth the claims of Swedish gymnastics merely because it is scientifically correct, not because it is Swedish.

VII.—THE THERAPEUTIC APPLICATION OF MEDICAL GYMNASTICS.

READ BEFORE THE SECTION FOR CLINICAL MEDICINE, PATHOLOGY, AND HYGIENE OF THE MASSACHUSETTS MEDICAL SOCIETY (SUFFOLK),
MARCH 13, 1889.

(*Reprinted from the* Boston Medical and Surgical Journal, *May* 9, 1889.)

The word *gymnastics* is generally understood as meaning systematic exercise of the muscles, for the restoration of health, and for the development and preservation of the physical powers. Hence gymnastics must be considered, not only as an educational and hygenic agent, but as a curative means as well. It naturally follows that the character of the exercises must vary according to the purposes for which they are applied.

Though exercise of one kind or another has been used since time immemorial for curative purposes, we owe it to the Swede P. H. Ling and his followers that each branch of gymnastics has been given a more distinctive character, and that a new impetus has been given to the medical part of this science. Ling divided gymnastics into two main branches, medical and educational, the names denoting their aims. The medical branch has been commonly known as "Swedish Movement Cure," "Movement Treatment," etc. I prefer to use the name "medical gymnastics" in this last sense, as these words have a wider significance than the word "massage," which usually is understood as denoting one of the procedures of friction, kneading, and percussion Each one of these manipulations might, however, be regarded as passive exercise of the muscles, and as such to belong among the procedures of medical gymnastics,

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Medico-gymnastic movements are *active* when executed by the patient himself, as for instance the voluntary motion of the forearm as in flexion; if the operator makes resistance against this movement, it becomes *resistive*; if he helps the patient in performing it, it becomes *assistive*; and if he is doing the movement without any voluntary effort whatsoever from the patient, the movement is called *passive*. The passive and resistive movements are the ones most used in the application of this treatment; the assistive substituting the resistive where the voluntary nerve-impulse is deficient, and the active ones serving for home exercise where this is desirable. All these movements may now be given the usual names of flexion, extension, abduction, adduction, etc., etc., and some of them can be applied by machinery, such as vibration and circumduction. As for "mechanical massage" I quite agree with Zabludowzky and other authorities, that nothing done by machinery can ever be worthy of the name of *massage.*

"The effect of a movement is the result of its *action*, and the *reaction* of our organism"; the effect may be physical, physiological and psychological, and movements have also both a general and local effect. Usually the local effect decides the use of a movement, although its general effects should never be left entirely out of consideration. The local effects of active movements in general are stronger innervation or increased cerebral influence upon the nerves, and increased afflux of arterial blood into the active parts. This afflux in some parts lessens the amount of blood supplied to other parts; and thus in the active movements we have a regulator for the hydrostatic pressure of the blood,—a means of preventing and relieving active hyperæmia. It also follows that we are able to overcome the atrophy of some parts by increasing the local nutritive activity, and to counteract hypertrophy by lessening the arterial supply, *i. e.*, by leading it into channels where it is more needed. The local effects of active movements are highly increased by making the movements resistive, whereas they are lessened if the movements take the assistive form.

The effects of passive movements differ somewhat from those produced by the active ones. For, whereas the active movements harden the fibrous tissues and lessen the adipose ones, the passive movements make lamellous texture predominant and cause a greater amount of fat to accumulate between the muscles and under the skin.

As a rule, the "prescription" for each particular case treated by medical gymnastics should contain both passive and active (resistive or assistive) movements, selected according to the above principles. The number of different movements given in one application should be reduced to its *minimum;* usually it is not less than six and not more than twelve, occupying from thirty to sixty minutes. These movements must follow each other in such a manner that the effect of one does not neutralize the effect of the one just given, or *vice versa.* The movements, at first given gently and tentatively, should grow in power and duration in even pace with the strength of the patient; and it has been found advantageous to begin and end each application by some gentle exercises chosen for their general effects, and to put the more specific movements in the middle of the prescription. It is customary to allow a brief interval of "rest" after every two movements; it should be understood, however, that the patient does *not* lie down, but moves around if his strength allows it; for this pause is made so that the reaction may set in—"the movement may be 'assimilated' "—and this occurs sooner if the patient does not lie down, as gravitation has less influence on the circulation when we walk than when we lie down. It should be left to the physician, or in his absence, to the operator, to decide the duration and frequency of each movement, for, as a rule, a patient is no more competent to prescribe what movement and how much of it he ought to take, than he is to prescribe his own medicine.

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If we turn to the more immediate subject of this paper, or how to apply the movements, we are naturally led first to consider the disorders of the *circulatory system*, as the effects produced by movements are most noticeable in the changes caused in the circulation.

As it is well known how bodily movements increase the activity of even the healthy heart, it has been questioned whether it would be safe to apply movements when the heart is diseased and consequently still more sensitive. The question is, whether it is possible to give any movements that could help and regulate the circulation without increasing the activity of the heart. Various movements have been applied to persons suffering from heart-disease, and their effects have been investigated by observing the heart's action at the beginning and end of each movemant; and it has been found that there are both active and passive movements which will quiet and regulate the heart's action. How massage acts in these cases has been neatly illustrated by Dr. Douglas Graham, when he describes "the contracting hands of the manipulator" as "two more propelling hearts at the peripheral ends of the circulation, co-operating with the one at the centre," etc. But that is not all: if they are done in easy, restful positions, active movements can also be performed. When the force of the movement is carefully graded according to the severity of the case, the pulse becomes fuller and more even, but not more rapid. The aim of the movements will be to diminish the irritability of the parts in the immediate neighborhood of the heart, which is done by passive expansion of the chest cavity; and to prevent the too rapid afflux of the blood to the heart by increasing the circulation in peripheral parts. Whether the disease takes the form of hypertrophy, dilation, fatty degeneration, or valvular deficiency, the character of the movements used will be very much the same, the chief object being to regulate the circulation of the blood and lymph. Among movements that have the best effects are the so-called "respiratory" exercises. These consist in passive expansions of the patient's chest by the operator, while the patient is breathing, as follows: the patient sits on a chair (without a back); the operator, standing or sitting behind, grasps the patient under the arms, which are hanging loosely down; now the operator lifts the patient's shoulders upward and backward, while the patient inhales, and lets them gently sink, while he exhales. In this way the respiration becomes very deep, without any increased nerve-impulse from the patient, and the heart's action is by no means accelerated. The negative pressure produced during inhalation in the organs in the chest-cavity outside the lungs can in this way be made from five to six times greater than what it is during ordinary inhalation (which, according to Dr. Wundt, corresponds to the pressure of a 7.5 mm. quicksilver cylinder); and the circulation in the adjacent veins is accelerated in proportion. The closing of the semi-lunar valves during the diastole of the ventricles and the resistance of the arterial walls prevent any marked retardation of the arterial currents. The effect can be still more increased if the operator lifts the patient's arms to a horizontal position during the inhalation, and again lowers them during the exhalation. Here the elevation of the arms not only expands the chest, thus aiding the respiratory act, but it also straightens the curve of the axillary artery, which lessens the resistance to the arterial current toward the arm, that is, the pressure in direction of the heart is lessened. These movements can be varied in many ways.

Prof. Lovén, of Stockholm, has said that "at the greater number of the articulations, but especially around the hip and shoulder-joints, as well as at the lower part of the neck, the superficial part of the walls of the veins is usually fastened on aponeuroses and fasciæ, which by certain movements are extended so that the veins are expanded. This causes in these veins a suction which powerfully accelerates the return current. By the alternate motions of the joints the veins may thus be alternately extended and contracted, filled with blood and again emptied. This is true not only of the extremities, but also and especially of the largest of all the veins, the inferior vena cava, which is so located along the front of the spine that it must follow the movements of the latter. If the thorax be bent forward, this vein becomes highly contracted, again to expand when the trunk is straightened. Experiments have proved that the capacity of the vessel largely increases at such extension. It is easy to understand how at extension, and still more at backward flexion of the trunk, a suction is caused in all those veins which supply the inferior vena cava, especially in those of the lower extremities. A similar condition takes place in the veins of the arms when these are extended sideways and somewhat backward, with the hands closed. Finally, as regards the jugular veins, these are the most extended when the head is bent backward with upturned face."

The flow of the lymph is accelerated in proportion with that of the blood, the negative pressure, as described above, causing a suction also in the thoracic duct, and the increased pressure of the blood, produced by suitable movements, accelerating the flow also in peripheral lymph-vessels. An average "prescription" for heart-diseases would have the following appearance:—

1. Passive foot circumduction; reclining position.
2. Forearm flexion and extension with gentle resistance; reclining position.
3. Passive hip circumduction; reclining position.
4. Resistive foot-flexion and extension; standing position
5. Percussion on cardiac region of chest (specific in heart-diseases).
6. Passive trunk circumduction; patient sitting astride a chair.

7. Resistive leg extension, one leg at a time; reclining position.

8. Passive arm circumduction.

After each movement a passive respiratory exercise.

In three cases of heart disease which came under my care, two of dilatation, one of fatty degeneration, the movements used were substantially the same as the above; and although, of course, no *cure* was effected, there was a decided improvement of the symptoms. This is about all that can be expected, as an organic disorder of the heart but seldom changes into health. To alleviate the suffering and prevent any changes for the worse, is at least something gained; and no other means will prove so effective in this respect as medical gymnastics; but to secure any permanent results the movement treatment must be continued for long periods; or, as Dr. Zander, of Stockholm, has put it: "In heart-disease, movement treatment is an uninterrupted necessity, at least during the winter."

The same may be said of aneurism, which disease has sometimes been treated by medical gymnastics, the movements being similar to those used for heart-diseases, and their object being the same: to promote the circulation of the blood. In one case of aneurism of aorta decendens, sent to me by a physician, some of the symptoms (numbness of the lower extremities and incontinentia urinæ) yielded readily to the treatment, but returned shortly after the patient had ceased to take treatment.

Of other diseases of the circulatory organs only varicose veins are amenable to this form of treatment. Dr. Hartelius, of Stockholm, states that this disorder cannot be cured by medical gymnastics. I have had more good fortune than he, for I have at least one cure to report:—

Mr. J. L., aged twenty-six, had very pronounced varix of the left internal saphenous vein. His business compelled him to stand for ten or more hours a day, and this had caused passive hyperæmia of the whole pelvic region, producing constipation, enlargement of the prostate, cystitis, and finally this varix. The treatment given was:—

1. Resistive arm flexion and extension upward, to increase the arterial current in the upper thorax and arms, as well as to increase the chest capacity.

2. Passive hip circumduction (as described before).

3. Passive trunk circumduction (as before).

4. Brief percussion along the varicose veins so as to stimulate the vasomotor nerves and cause the vessels to contract. During this procedure the patient was lying on his back with his legs higher than the rest of his body, so that the posture might aid the venous current.

5. Resistive trunk rotation to bring into play those muscles that perform the expulsory act and thus to relieve the constipation.

6. Pressure over the public crest, patient reclining, with relaxed abdomen. This movement is a specific against cystitis, acting on the nerves of the

bladder.

7. Same as No. 4, followed by a brief kneading to prevent any soreness of surrounding tissues.

8. Percussion on the scarum with closed fist, so as to stimulate the plexus that supplies the nerves to the pelvic viscera.

After a few weeks some stronger resistive movements of the legs were added to the above, and after three months and a half of daily treatment (counting out Sundays and a few other days), the varicose veins were no longer visible; the other symptoms had also disappeared, except the cystitis, which, had lessened considerably, the desire to urinate being much less frequent.

Some diseases of the *respiratory organs* can be advantageously treated by medical gymnastics alone, especially disorders of the lungs; and that this should be the case is easily understood, when we remember that "deficient exercise is one of the causes which favor those nutritional alterations in the lung which we class as tuberculous." (Dr. C. A. Parkes). Consumption has ceased to be an incurable disease, for, if taken hold of in time, it will yield to medico-gymnastic treatment. The movements are here directed so as to aid the action of the heart, increase the chest capacity, and improve the general nutrition. Swedish physicians have some glorious results to show, which space forbids me to mention here.

Of bronchitis I have a case to report:—

Miss N. P. S., aged twenty-two, contracted a severe cold, which developed into chronic bronchitis; when she came to me (January, 1887) she had tried everything else and had finally been advised to go South. The general object of my treatment was here to increase the skin-evaporation by accelerating the cutaneous circulation (general massage), to keep the bowels active (resistive trunk-rotation), and to promote the reabsorption of the bronchial mucus. The last-named end was achieved by passive vibrations of the thorax and chest percussion with the ulnar boarders of the hands. A few respiratory movements were added to the specific ones. My treatment cured her in the remarkably short time of five days, with one application a day.

Asthma and emphysema can be treated by movements with equal success although these two diseases may be considered as the opposites of each other. In asthma the nervous contraction of the respiratory muscles prevents the chest from expanding and the air from entering until the accumulation of carbon dioxide in the blood finally relaxes the muscles, whereas in emphysema the air-cells are enlarged, refuse to contract and to expel the air; the patient strains all his muscles to widen his chest, the thorax becomes arched and permanently dilated. Percussion on the chest is the specific movement in both cases; in asthma it is continued for a long period at a time, as this will cause a relaxtion of the respiratory muscles; the percussion must be alternated by kneading, or the muscles will be sore; other movements can also be given to prevent stasis. In emphysema the percussion is used only for short periods at a time, as its object here is to cause the intercostals to contract; and, whereas in asthma it is applied principally around the base of the lungs, in emphysema the upper part of the chest is the region to be subjected to this procedure. In asthma the passive respiratory movements play an important rôle, whereas in emphysema we give a movement to contract the chest as follows: the patient sits in a stooping position with arms extended sideways, and moves his arms horizontally forward, while the operator resists the motion. In this way the excessive contraction of the upper portion of the pectorals compresses the upper portion of the chest, and the air is forcibly expelled.

In disorders of the *digestive organs* a great deal can be done by massage, and still more by Swedish movements. The general object of the treatment would be to improve the general assimilation, to regulate the hepatic circulation and the peristaltic action of the stomach and intestines. Suitable movements are passive vibration, applied on the relaxed abdomen by the operator's hand, and rapid, passive trunk-rotation in a stooping, sitting position, both of which lessen the peristalsis; also deep kneading of the colon, which has the opposite effect.

Of fifteen cases of dyspepsia (this word used in its pathological sense) I have accomplished eight cures, four were improved, and three unchanged; the average time of treatment has been seven to nine weeks.

Of neuralgia I will mention the following cases:

Mr. H. W. G., aged forty, had for some time suffered from neuralgia of the left shoulder and arm, the pain extending from the neck to the thumb, which latter was quite numb. He was given local massage and resistive movements of the arm and hand, ten applications in as many days, and the result was a permanent cure.

Mrs. T. J. F., aged thirty-five, had an acute attack of neuralgia in the right shoulder and upper arm, so that she could not use this arm for any sort of work. Had two applications. Result: permanent cure.

Miss F. C., aged thirty-six, had suffered for some time from intercostal neuralgia of the left side Cured by two applications.

Miss H. L. G., aged twenty-eight, had suffered from neuralgia of the trigeminus for six months, finally was not able to lie down, and had not slept for several nights when she came under my care (June, 1888). She had tried everything but massage. After the fourth application the pain had entirely disappeared, leaving only a "consciousness" of the trouble; four more applications cured her, and she has had no return since that time.

In diseases of the *organs of locomotion* much has been done by medical gymnastics, where next to nothing could be accomplished by massage, properly so-called. This refers especially to deformities; and it might be added that medical gymnastics usually will do more, and do it in a shorter time, than the orthopædic treatment. Eulenburg's words (in 1853) that "Ling's method is the only truly rational therapeutic means for the cure of chronic disturbances of motivity," and that "spinal curvatures, resulting from faulty carriage (in consequence of a preponderance of muscular force on one side of the body), are nowadays never treated by any good orthopædist by any other means than the Swedish system," seem reasonable, for although we may extend contracted parts by mechanical appliances, this does not develop any antagonistic forces that would counteract a return to the abnormal shape.

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In medical gymnastics there is a vast field for an exploring scientist, and there is an increasing demand from the medical profession in general that the physicians should themselves take this matter in hand, and not leave it to be practised only by uneducated charlatans, and by a few specialists who have had a medical education for this particular purpose. The physician would then prescribe this treatment where it is indicated, and if he had not the time nor the desire to apply it himself, he might be able to assist the *masseur* by his greater and more extensive knowledge of general pathology, which a specialist will always more or less lack.